

REMARKS

I. PRELIMINARY REMARKS

Claims 55, 57 and 58 have been amended. No claims have been added. Claims 31 and 33-35 have been canceled. Claims 1-30 and 53-62 remain in the application. Claims 10, 11, 16 and 17 have been withdrawn from consideration. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Applicant notes that the Office Action indicated that claims 24 and 57 are directed to patentable subject matter. As claim 57 has been rewritten in independent form, applicant respectfully submits that claim 57 is in condition for allowance.

II. REJECTION UNDER 35 U.S.C. § 112

Claim 33 has been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As claim 33 has been canceled, applicant respectfully submits that the rejection under 35 U.S.C. § 112 has been rendered moot.

III. REJECTION UNDER 35 U.S.C. § 102

A. The Rejection

Claims 22, 23, 25-31, 33-35, 55, 56 and 58-62 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,653,005 to Muradov ("the Muradov '005 patent"). As claims 31 and 33-35 have been canceled, applicant respectfully submits that the rejection thereof under 35 U.S.C. § 102 has been rendered moot. The rejection of the remaining claims under 35 U.S.C. § 102 is respectfully traversed with respect to the claims as amended above. Reconsideration thereof is respectfully requested.

B. The Muradov '005 Patent

Referring to Figure 1 and column 7, lines 14-62, the Muradov '005 patent discloses a hydrogen generator 10 that includes a heating element 11, a porous reaction chamber 12, a hydrogen selective membrane 14 that is located outside the reaction chamber, inlets 15 and 16, and a hydrogen outlet 17. Ceramic fiber 18, which is located within the bottom portion of the reaction chamber 12, is soaked with fuel that is introduced into the reaction chamber by way of inlet 16. Catalytic material 13 is fed into the top portion of the reaction chamber 12 by way of inlet 15.

"After the reaction chamber is charged with CM 13 and hydrocarbon fuel, **the inlets 15 and 16 are closed** and the apparatus is ready for portable application." [Column 7, lines 35-38, emphasis added.] "[T]he lower part of the reaction chamber is utilized as a fuel storage. This **eliminates altogether the need for a special fuel storage container**, a pump to deliver a fuel to the reaction chamber and a fuel evaporator." [Column 8, lines 5-9, emphasis added.] After the hydrogen generator 10 has been used, "**solid** carbon product" is dislodged from the reaction chamber 12 through inlet 15. [Column 7, lines 32-34, emphasis added.]

C. Discussion Concerning Claims 22, 23 and 25-30

Independent claim 22 is directed to a fuel cartridge comprising "a fuel reservoir" and "a reaction chamber." The "reaction chamber" includes "a catalyst, an inlet operably connected to the fuel reservoir, a gas outlet, **means ... for letting liquid out of the reaction chamber**, and a substantially gas permeable/substantially liquid impermeable structure that substantially surrounds the catalyst and separates the inlet from the gas outlet." The respective combinations defined by claims 23 and 25-30 include, *inter alia*, the elements recited in claim 22. Applicant respectfully submits that the Muradov '005 patent fails to teach or suggest each and every element in the claimed combinations.

At the outset, applicant notes that the independent claim 22 includes a means-plus-function element. The MPEP requires a two-part analysis of means-plus-function

elements. **First**, “the application of a prior art reference to a means or step plus function limitation **requires** that the prior art element **perform the identical function** specified in the claim.” [MPEP § 2182, emphasis added.] **Second**, “**if a prior art reference teaches identity of function** to that specified in a claim, **then** under *Donaldson* an examiner carries the initial burden of proof for showing that the prior art structure or step is the same as or equivalent to the structure, material, or acts described in the specification which has been identified as corresponding to the claimed means or step plus function.” [Id., emphasis added.] Along these lines, the Federal Circuit stated that “[t]he corresponding structure to a function set forth in a means-plus-function limitation **must actually perform the recited function, not merely enable the pertinent structure to operate as intended**.” *Asyst Technologies Inc. v. Empak Inc.*, 60 USPQ2d 1567, 1672-73 (Fed. Cir. 2001), emphasis added.

Turning to the Muradov ‘005 patent, the Office Action has taken the position that the entire hydrogen generator 10 corresponds to the claimed “reaction chamber” and that inlet 15 corresponds to the above-quoted means-plus-function element. Even assuming for the sake of argument that the entire hydrogen generator 10 could reasonably correspond to the claimed “reaction chamber,” inlet 15 cannot correspond to the claimed “means ... for letting liquid out of the reaction chamber” because inlet 15 **does not perform the function of letting liquid out** of the hydrogen generator 10. To the contrary, the Muradov ‘005 patent specifically indicates that inlet 15 performs the function of letting **solids** out of the hydrogen generator 10.¹

As the Muradov ‘005 patent fails to teach or suggest each and every element of the combination recited in independent claim 22, applicant respectfully submits that claims 22, 23 and 25-30 are patentable thereover and that the rejection under 35 U.S.C. § 102 should be withdrawn.

¹ “[**S**]olid carbon product is dislodged from the [reaction] chamber after the operation from the same inlet 15.” [Column 7, lines 32-34.] Note that inlet 15 also performs the function of letting **solids** (i.e. catalytic material) into the reaction chamber 12. [Column 7, lines 48-58.]

D. Discussion Concerning Claims 55, 56 and 58-62

Independent claim 55 is directed to a fuel cartridge comprising **“a cartridge housing,”** “a reaction chamber ... located ***within the cartridge housing,***” “an enclosed substantially gas permeable/substantially liquid impermeable structure ... located ***within the reaction chamber*** such that a gap extends around the exterior surface from the exterior surface to the interior surface of the reaction chamber,” “a catalyst located within the interior of the enclosed substantially gas permeable/substantially liquid impermeable structure” and **“a fuel reservoir, located within the cartridge housing and outside the reaction chamber, operably connected to the reaction chamber fuel inlet.”** The respective combinations defined by claims 56 and 58-62 include, *inter alia*, the elements recited in claim 55.

Applicant respectfully submits that the Muradov '005 patent fails to teach or suggest each and every element in the claimed combinations. For example, even assuming for the sake of argument that the outer wall of the hydrogen generator 10 corresponds to the claimed “fuel cartridge housing,” the hydrogen selective membrane 14 corresponds to the claimed “reaction chamber,” and the reaction chamber 12 corresponds to the claimed “substantially gas permeable/substantially liquid impermeable structure,” there simply is no “fuel reservoir ... located within the cartridge housing (here, the outer wall of the hydrogen generator 10) **and outside** the reaction chamber (here, hydrogen selective membrane 14),” as is called for in claim 55. To the extent that there even is a “fuel reservoir,” the Muradov hydrogen generator stores fuel within the ceramic fiber 18, and the ceramic fiber is ***inside*** the hydrogen selective membrane 14.

As the Muradov '005 patent fails to teach or suggest each and every element of the combination recited in independent claim 55, applicant respectfully submits that claims 55, 56 and 58-62 are patentable thereover and that the rejection under 35 U.S.C. § 102 should be withdrawn.

E. The Purportedly Inherent Subject Matter

To the extent that they have not been rendered moot, applicant respectfully traverses the statements concerning purportedly inherent subject matter on pages 3 and 5 of the Office Action. The Office Action has apparently taken the position that unseen fuel and byproduct reservoirs, which are purportedly connected to the inlets 15 and 16, are inherently part of the hydrogen generator 10. Not only are such fuel and byproduct reservoirs not ***necessary present***,² the Muradov '005 patent actually makes it perfectly clear that they are ***necessary not present***.

In particular, the Muradov '005 patent states that “[a]fter the reaction chamber is charged with CM 13 and hydrocarbon fuel, the ***inlets 15 and 16 are closed*** and the apparatus is ready for portable application” and also states that ***after*** the hydrogen generator 10 is used, byproduct is dislodged from the reaction chamber 12 through inlet 15. [Column 7, lines 32-38.] In other words, fuel and byproduct are not transferred to and from the hydrogen generator 10 when it is actually being used. Additionally, nothing in the Muradov '005 patent even remotely suggests the apparatus used to perform the filling and emptying functions associated with the inlets 15 and 16, if any, is part of the hydrogen generator 10 itself. [It is also worth noting here that the claims at issue are directed to “fuel cartridges,” not to systems including cartridges and re-conditioning stations.] Finally, the fuel storage that is actually associated with the hydrogen generator 10 itself takes place within the ceramic fiber 18 that is located within the reaction chamber 12 which, in turn, is located within the hydrogen selective membrane 14. [Column 8, lines 5-9.]

² With respect to purportedly inherent subject matter, the Federal Circuit stated that “[t]o serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with the recourse to extrinsic evidence” and that “such evidence must make it clear that the missing descriptive matter is ***necessarily present*** in the thing described in the reference.” *Continental Can Co. USA v. Monsanto Co.*, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991) (emphasis added). “Inherency ... may not be established by probabilities or possibilities.” *Id.*

IV. REJECTION UNDER 35 U.S.C. § 103

A. The Rejection

Claims 1-9, 12-15, 18-21, 53 and 54 have been rejected under 35 U.S.C. § 103 as being unpatentable over the combined teachings of U.S. Patent Pub. No. 2001/0045364 to Hockaday et al. (“the Hockaday ‘364 publication”) and U.S. Patent No. 5,070,899 to Matkovich et al. (“the Matkovich ‘899 patent”). The rejection under 35 U.S.C. § 103 is respectfully traversed. Reconsideration thereof is respectfully requested.

B. The Cited References

The Hockaday ‘364 publication discloses a variety of hydrogen generation devices that provide a controlled fuel stream. [Abstract and paragraph 0017.] One of the key features of the Hockaday hydrogen generation devices is that they are **operable in any orientation**. [Abstract and paragraph 0017.] As illustrated in Figure 9, which was referenced in the Office Action, one of the hydrogen generation devices stores fuel 7 in a wicking material 114 that is inside a bladder 113. The bladder 113 maintains pressure on the fuel 7. A puncture needle 111 is used to connect the bladder 113 to a container 122 with catalytic surfaces 107. Hydrogen gas, which is produced as a result of the interaction between the fuel 7 and the catalytic surfaces 107, is free to flow out of the container 122. In order to control gas production, the flow of fuel 7 through the needle 111 is actively controlled by a valve 110.

Turning to Figure 3, the Hockaday percolation generator 12 includes fuel 7 and wicking material 39 within a porous hydrophobic liner 32. The liner 32 is located within an elastic chamber 38. A capillary tube 40 with a catalyst coating 33 is located within an unnumbered structure positioned within the wicking material 39. It appears that the capillary tube 40 receives fuel 7 by way of the capillary exit 35. Hydrogen produced by the reaction within the capillary tube 40 exists the unnumbered structure through a filter 31. Fuel 7 and, apparently, byproducts are returned to the interior of the liner 32 by way of an

exit 34 and a vent 42. Excess hydrogen that fills a void 36 between the liner 32 and elastic chamber 38 as the fuel 7 is consumed is vented by a gas pressure vent 37.

The Matkovich '899 patent discloses a check valve 10 that is designed to **facilitate the downward flow** of a first liquid and to prevent upward flow (i.e. backflow) through the valve. [Figure 1; column 2, lines 1-19.] The configuration of the check valve 10 is also such that it operates only when in a generally vertical orientation. [Column 3, lines 25-30; and column 5, lines 8-19.]

C. Discussion Concerning Claims 1-9 and 53

Independent claim 1 calls for a combination of elements including “an open region that connects [a] fuel reservoir to [a] reaction chamber” and “a **passive structure** located within the open region adapted to resist fluid flow from the fuel reservoir to the reaction chamber.” The respective combinations defined by claims 2-9 and 53 include, *inter alia*, the elements recited in claim 1.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, and as noted in the Office Action, the Hockaday valve 110 is not a “passive structure.” In yet another attempt to meet the limitations of the present claims, the Examiner has now taken the position that it would have been obvious to put a Matkovich fluid check valve 10 “in the passage along with the general valve (110) of Hockaday et al. in order to prevent backflow and yet still allow the desired fluid flow to the reaction chamber.” [Office Action at page 7.]

There are a variety of errors associated with this position. Most notably, the Office Action failed to so much as begin to address the following question - what would have possibly motivated one of skill in the art to add a valve that is only capable of preventing upward flow, and is only capable of operating within a small range of orientations, to a hydrogen generation device that is specifically designed to operate in any orientation? For example, in the orientation illustrated in Figure 9, the fuel flows upwardly from the bladder 113 to the container 122. The Office Action has apparently taken the position that it would have been obvious to add a device to the Hockaday hydrogen generation device which

prevents the intended upward flow from the bladder to the container, and allows backflow from the container to the bladder.

There is also nothing in the references themselves to suggest combining them in the manner proposed in the Office Action, and the Office Action failed to point to any knowledge in the art that would have suggested the proposed combination.

In view of the foregoing, applicant respectfully submits that the Office Action again failed to make a *prima facie* case of obviousness with respect to claims 1-9 and 53 and that the rejection of claims 1-9 and 53 under 35 U.S.C. § 103 should be withdrawn.

D. Discussion Concerning Claims 12-15 and 54

Independent claim 12 calls for a combination of elements including “an open region that connects [a] fuel reservoir to [a] reaction chamber” and “a ***passive structure located within the open region*** adapted to create ***capillary forces to resist flow*** of the fuel containing substance from the fuel reservoir to the reaction chamber.” The respective combinations defined by claims 13-15 and 54 include, *inter alia*, the elements recited in claim 12.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, and referring to Sections III-B and III-C above, the Hockaday '364 publication fails to teach or suggest a “passive structure” and there is simply no reason, other than a hindsight attempt to replicate the claimed inventions, to add the Matkovich check valve 10 to the Hockaday hydrogen generation device. The Hockaday hydrogen generation device is specifically designed to operate in any orientation, while the Matkovich check valve 10 is only capable of operating within a small range of orientations. There is also nothing in the references themselves to suggest combining them in the manner proposed in the Office Action, and the Office Action failed to point to any knowledge in the art that would have suggested the proposed combination.

For the reasons presented above, applicant respectfully submits that the Office Action failed to make a *prima facie* case of obviousness with respect to claims 12-15

and 54 and that the rejection of claims 12-15 and 54 under 35 U.S.C. § 103 should be withdrawn.

E. Discussion Concerning Claims 18-21

Independent claim 18 calls for a combination of elements including “an open region that connects [a] fuel reservoir to [a] reaction chamber” and “control **means**, associated with the open region, **for passively resisting fluid flow** from the fuel reservoir to the reaction chamber and permitting fluid flow from the fuel reservoir to the reaction chamber in response to the presence of a predetermined pressure gradient across the control means.” The respective combinations defined by claims 19-21 include, *inter alia*, the elements recited in claim 18.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, the Hockaday valve 110 does not perform the function of passively resisting fluid flow and, as discussed in Sections III-B and III-C above, there is simply no reason to add the Matkovich check valve 10 to the Hockaday hydrogen generation device. The Hockaday hydrogen generation device is specifically designed to operate in any orientation, while the Matkovich check valve 10 is only capable of operating within a small range of orientations. There is also nothing in the references themselves to suggest combining them in the manner proposed in the Office Action, and the Office Action failed to point to any knowledge in the art that would have suggested the proposed combination.

For the reasons presented above, applicant respectfully submits that the Office Action failed to make a *prima facie* case of obviousness with respect to independent claims 18-21 and that the rejection of claims 18-21 under 35 U.S.C. § 103 should be withdrawn.

V. CLOSING REMARKS

In view of the foregoing, it is respectfully submitted that the claims in the application are in condition for allowance. Reexamination and reconsideration of the application are respectfully requested. Allowance of the claims at an early date is courteously solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is respectfully requested to call applicant's undersigned representative at (310) 563-1458 to discuss the steps necessary for placing the application in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-2025. Should such fees be associated with an extension of time, applicant respectfully requests that this paper be considered a petition therefor.

Respectfully submitted,

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